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WORLD DATA CENTER A
Oceanography

OCEANOGRAPHIC DATA EXCHANGE

1988

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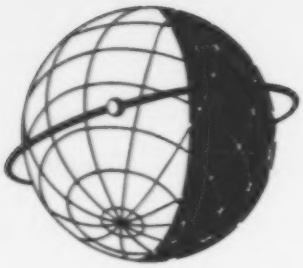

OCEANOGRAPHIC DATA EXCHANGE
1988

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ABSTRACT

This report summarizes the oceanographic data exchange activities of World Data Center A (WDC-A), Oceanography during 1988. It includes tabulations of data received during 1988, as well as summarizations of oceanographic station data, bathythermograph data, biological observations, and surface and subsurface current measurements received prior to 1988. International data inventory forms received by this Center are also summarized. Data and inventory forms received are tabulated by nation, ship, cruises, and types of format and observation as appropriate. Quantitites of data, publications, and information supplied to other nations and international organizations are also tabulated.

APPRECIATION

James Churgin retired as Director, WDC-A, Oceanography on 31 December. Mr. Churgin's 14-year tenure was marked by an intense dedication to the principles of international oceanographic data exchange thru the ICSU/WDC system, an innate ability to foresee and meet new challenges confronting WDC-A, Oceanography, and an outstanding record of service to the international oceanographic community. His term as Director spanned almost half of the total years of the Center's existence.

INTRODUCTION

The World Data Center system was established in 1957 to collect data from the numerous and widespread observational programs of the International Geophysical Year (IGY) and to make such data readily accessible to interested scientists and scholars. The International Council of Scientific Unions (ICSU) Panel on World Data Centers is responsible for the operation of all WDC's. The guidelines which govern international exchange of oceanographic observations are found in both the ICSU's Guide to International Data Exchange through the World Data Centres and the Intergovernmental Oceanographic Commission's (IOC's) Manual on International Oceanographic Data Exchange.

The WDC system consists of World Data Center A (WDC-A) located in the United States; WDC-B located in the U.S.S.R.; and several WDC-C's located in Western Europe and Japan. WDC-A is established under the auspices of the U.S. National Academy of Sciences, where the Coordination Office is located. WDC-A is divided into nine discipline subcenters. These centers are located in institutions that can best serve the interests of science because of their data-handling capabilities for the appropriate scientific disciplines. WDC-A, Oceanography, is collocated with the National Oceanographic Data Center (NODC) in Washington, D.C. WDC-A, Oceanography does not process oceanographic data; NODC performs this function on WDC-A's behalf.

During 1988, WDC-A received data for 73,039 marine scientific observations, including 34,432 oceanographic stations, 14,806 bathythermograph observations, 4,533 biological observations, and 19,268 current measurements. The international marine data base of the Center now contains data for 2,243,551 marine scientific observations. All data held by the Center are tabulated in this report and described in Change Notices to the Catalogue of Data. The Catalogue is available to qualified requesters in the international scientific community. This report also contains a section on international data management activities, including information about RNODC data services. WDC-A, Oceanography, also received a total of 1,280 scientific publications and articles from 38 nations and 13 international organizations; they are listed and indexed in Supplement 19 to the Catalogue of Accessioned Publications.

A total of 710 Report of Observations/Samples Collected by Oceanographic Programs (ROSCOP) forms describing international cruises were received by WDC-A during 1988. The total number now on hand is 17,890. Data inventory forms such as ROSCOP provide WDC-A, Oceanography, and other centers with a means for determining the availability of internationally exchangeable data in advance of their receipt by the data center. The report also includes a tabulation of National Oceanographic Programs (NOP's) and Declared National Programs (DNP's) as identified in IOC documents.

DATA ACQUIRED

The international marine data base of the Center at the end of 1988 contained data for 2,243,551 observations, including 928,762 oceanographic stations, 504,744 bathythermograph (BT) observations, 135,638 biological observations, 649,078 current measurements, 18,184 geological samples, and 7,145 geophysical observations. The percentage of the international marine data base represented by each data category is given in figure 1. The growth of the oceanographic station data base since 1974 is shown by year in table 1. A total of 91,921 oceanographic stations, or approximately 9.9 percent of the total station data base, represent data obtained by electronic, insitu, CTD/STD sensors.

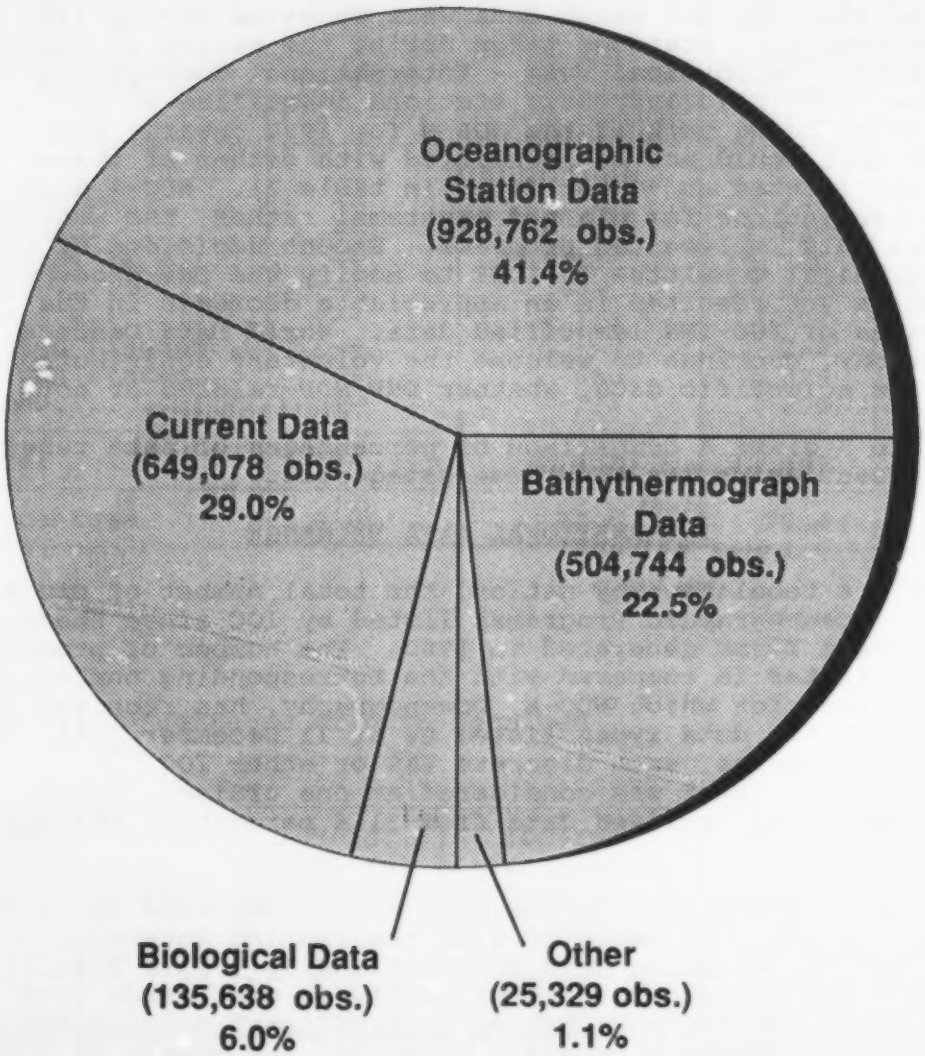
The total number of marine scientific observations for which WDC-A received data during the year was 73,039. Included in this total were data for 34,432 oceanographic stations, 14,806 bathythermograph (BT) observations, 4,533 biological observations, and 19,268 current measurements. The recent enhancement of data bases of the World Data Centers, Oceanography, in support of climate-related programs seemed to slow somewhat during this period.

All data held by the Center are described in the Catalogue of Data and the Change Notices to the Catalogue. The Catalogue is available to qualified requesters in the international scientific community. There are no restrictions or limitations placed on data exchanged through the WDC system.

Table 1. -- Number of oceanographic serial stations received, 1975-1988

Year	Stations received during period	Stations on hand at end of period
	Number	Number
1975.....	34,782	482,626
1976.....	43,498	526,124
1977.....	22,197	548,321
1978.....	32,731	581,052
1979.....	38,790	619,842
1980.....	34,265	654,107
1981.....	37,087	691,194
1982.....	38,173	729,367
1983.....	39,453	768,820
1984.....	30,346	799,166
1985.....	30,412	829,578
1986.....	34,659	864,237
1987.....	30,093	894,330
1987.....	34,432	928,762

* Adjusted by inventory



Total: 2,243,551 obs.

Figure 1. -- International Marine Data Base

The oceanographic station data received by WDC-A, Oceanography, can be categorized as those resulting from (1) Declared National Programs (DNP's), (2) international cooperative expeditions, and (3) National Oceanographic Programs (NOP's) and other data exchange programs. Table 2 lists, by nation, the number of stations for which data were received during 1988 for these categories: stations taken during the period of the International Geophysical Year - International Geophysical Committee (IGY-IGC) (1957-59); stations identified in IOC documents as being part of the NOP's for 1960 onward; and stations that could not be identified with either of these categories (listed as "Other data" in table 2). WDC-A does not provide tabulations for planned programs; rather, the Center tabulates only implemented programs. Recent decisions by the IOC's Technical Committee on IODE to modify the DNP procedure have not as yet resulted in an appreciable decrease in the percentages of IOC-IMS identified data. World Data Centers, Oceanography, continue to welcome the voluntary contributions of all marine scientific data, whether DNP/NOP-related or not.

Table 3 gives a comparison of percentages of data received during recent years for the three categories.

INTERNATIONAL DATA EXCHANGE

Table 4 tabulates, by nation, the total number of cruises (National Oceanographic Programs) listed by IOC since these programs were first generated in 1960. The number of programs (cruises) listed is compared with the corresponding number of these programs for which WDC-A, Oceanography, has received at least one of the data types listed as of 31 December 1988. For tabulation purposes, each discrete IMS or other IOC identification number was considered as one cruise. WDC-A, Oceanography, has received data from 31.4 percent of the NOP cruises.

Declared National Programs have been considered those which a nation has publicly declared with the implied intention of exchanging the resulting data internationally. Data resulting from DNP's are exchanged internationally in accordance with provisions of the IOC's Manual on International Oceanographic Data Exchange. Table 5 totals, by nation, the number of NOP's (see table 4) that were further identified as DNP's. The number of DNP's listed in IOC information documents is compared with the corresponding number of these programs for which WDC-A, Oceanography, has received at least one of the types of data listed as of 31 December 1988. WDC-A, Oceanography, has received data from 35.3 percent of the DNP cruises. The IOC no longer publishes lists of DNP cruise programs for which data are internationally exchangeable. WDC-A will continue to accession data from historical lists of DNP cruises and will continue to tabulate such data in its reports. The term NOP now refers only to planned expeditions.

Table 2. -- Categories of oceanographic stations received during 1988

Nation	IGY-IGC (1957-59)	IOC-IMS (1960 onward)	Other data	Total
1. Argentina.....	--	29	--	29
6. Canada.....	--	1,151	8,087	9,238
14. Germany (F.R.)..	--	101	1,369	1,470
24. Japan.....	--	--	14,968	14,968
37. U.S.S.R.....	--	4,718	709	5,427
38. United Kingdom..	--	--	228	228
39. United States...	--	660	1,029	1,689
43. Korea.....	--	774	609	1,383
Total	--	7,433	26,999	34,432
Percentage	0.0	21.6	78.4	100.0

Table 3. -- Percentages of data received

Year	IGY-IGC (1957-59)	IOC-IMS (1960 onward)	Other data	Total
1977.....	0.1	53.9	46.0	100.0
1978.....	0.0	58.2	41.8	100.0
1979.....	0.5	48.4	51.1	100.0
1980.....	0.5	44.2	55.3	100.0
1981.....	0.0	40.2	59.8	100.0
1982.....	1.4	16.5	82.1	100.0
1983.....	0.0	28.1	71.9	100.0
1984.....	0.5	25.2	74.3	100.0
1985.....	0.7	21.6	77.7	100.0
1986.....	0.0	26.5	73.5	100.0
1987.....	0.0	24.5	75.5	100.0
1988.....	0.0	21.6	78.4	100.0

Table 4. -- National Oceanographic Programs (NOP'S)

	Nation	A Cruises listed in IMS †	B Cruises for which WDC-A has received data ‡	B/A Percent
1.	Argentina.....	291	71	24.4
2.	Australia.....	684	290	42.4
3.	Belgium.....	10	4	40.0
4.	Brazil.....	397	64	16.1
6.	Canada.....	225	68	30.2
7.	Chile.....	12	2	16.7
8.	Colombia.....	15	9	60.0
9.	Denmark.....	56	7	12.5
10.	Ecuador.....	5	0	0.0
11.	Finland.....	15	12	80.0
12.	Taiwan.....	4	4	100.0
13.	France.....	523	26	5.0
14.	Germany (F.R.)....	968	221	22.8
15.	Germany (D.R.)....	115	0	0.0
18.	Iceland.....	26	18	69.2
19.	India.....	87	13	14.9
20.	Indonesia.....	1	1	100.0
21.	Ireland.....	1	0	0.0
24.	Japan.....	3,733	2,211	59.2
26.	Netherlands.....	261	49	18.8
27.	New Zealand.....	78	5	6.4
28.	Norway.....	366	48	13.1
29.	Pakistan.....	5	0	0.0
30.	Peru.....	46	0	0.0
32.	Poland.....	63	36	57.1
33.	Portugal.....	3	2	66.7
34.	Spain.....	17	5	29.4
35.	Sweden.....	553	267	48.3
36.	South Africa.....	21	13	61.9
37.	U.S.S.R.....	1,016	373	36.7
38.	United Kingdom....	3,235	108	3.3
39.	United States.....	4,736	1,650	34.8
43.	Korea (Rep. of)...	88	7	8.0
45.	Nigeria.....	4	1	25.0
49.	Morocco.....	4	0	0.0
51.	Thailand.....	2	0	0.0
52.	Turkey.....	18	0	0.0
63.	Romania.....	6	2	33.3
66.	Algeria.....	15	0	0.0
69.	Tanzania.....	5	0	0.0
73.	China (People's Republic).....	81	10	12.3
76.	Bulgaria (People's Republic).....	4	0	0.0
	Total	17,795	5,597	31.4

† Each IMS or other IOC identification number is considered as one cruise.

‡ Includes data for any type of observation listed for a particular cruise and observed during the time period listed for that cruise.

Table 5. -- Declared National Programs (DNP's)

Nation	A Cruises listed in IMS †	B Cruises for which WDC-A has received data ‡	B/A Percent
1. Argentina.....	249	71	28.5
2. Australia.....	447	151	33.8
3. Belgium.....	3	2	66.7
4. Brazil.....	393	62	15.8
6. Canada.....	176	41	23.3
7. Chile.....	4	0	0.0
8. Colombia.....	15	9	60.0
9. Denmark.....	46	0	0.0
10. Ecuador.....	5	0	0.0
11. Finland.....	3	3	100.0
12. Taiwan.....	0	--	--
13. France.....	141	8	5.7
14. Germany (F.R.)....	78	29	37.2
15. Germany (D.R.)....	24	0	0.0
18. Iceland.....	6	5	83.3
19. India.....	11	0	0.0
20. Indonesia.....	0	--	--
21. Ireland.....	0	--	--
24. Japan.....	1,263	949	75.1
26. Netherlands.....	26	0	0.0
27. New Zealand.....	5	4	80.0
28. Norway.....	252	44	17.5
29. Pakistan.....	0	--	--
30. Peru.....	16	0	0.0
32. Poland.....	3	3	100.0
33. Portugal.....	0	--	--
34. Spain.....	9	4	44.4
35. Sweden.....	193	138	74.2
36. South Africa.....	0	--	--
37. U.S.S.R.....	1,049	385	36.7
38. United Kingdom....	847	26	3.1
39. United States.....	4,499	1,542	34.3
43. Korea (Rep. of)...	61	16	26.2
45. Nigeria.....	0	--	--
49. Morocco.....	0	--	--
51. Thailand.....	0	--	--
52. Turkey.....	0	--	--
63. Romania.....	6	2	33.3
66. Algeria.....	15	0	0.0
69. Tanzania.....	0	--	--
73. China (People's Republic).....	81	10	12.3
Total	9,926	3,504	35.3

† Each IMS or other IOC identification number is considered as one cruise.

‡ Includes data for any type of observation listed for a particular cruise and observed during the time period for that cruise.

INTERNATIONAL MARINE DATA BASE

Oceanographic Station Data Base

Table 6 summarizes the number of oceanographic serial stations receivied, with the various totals listed by year in which the stations were occupied (year the data were observed), and by nation under which these data are catalogued. Nations from which no station data have been received are not listed, although in some cases publications or other data may have been received. For each nation, the lines of the table are defined as follows:

Periods

Line (a) -- Number of stations on hand as of 31 December 1987.

Line (b) -- Number of stations received from 1 January through 31 December 1988.

Line (c) -- Number of stations on hand as of 31 December 1988.

Table 6 shows that most of the 928,762 oceanographic stations held by WDC-A, Oceanography, represent contemporary data observed since the beginning of the International Geophysical Year (IGY) in 1957. Only 3,093 stations, or less than one-half of 1 percent of the total station data base, were observed prior to 1957.

TABLE 6. – NUMBER OF OCEANOGRAPHIC STATIONS
YEARS DATA WERE OBSERVED

NATION	PERIOD	PRE-1957	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
1. Argentina	(a)	36	41	90	79	20	31	127	432	174	96	106	207	185	234	72
	(b)															
	(c)	36	41	90	79	20	31	127	432	174	96	106	207	185	234	72
2. Australia	(a)		271	260	556	317	847	856	896	784	670	504	836	1,099	747	389
	(b)															
	(c)		271	260	556	317	847	856	896	784	670	504	836	1,099	747	389
3. Belgium	(a)		40	20	35	45	359	36	20	30	34					
	(b)															
	(c)		40	20	35	45	359	36	20	30	34					
4. Brazil	(a)		99	27	94	102	98	82	138		137	356	440	288	360	121
	(b)															
	(c)		99	27	94	102	98	82	138		137	356	440	288	360	121
6. Canada	(a)		221	870	1,268	1,630	2,277	2,425	2,071	1,221	1,581	1,308	1,991	3,432	2,446	2,032
	(b)					22	24									
	(c)		221	870	1,268	1,652	2,301	2,425	2,071	1,221	1,581	1,308	1,991	3,432	2,446	2,032
7. Chile	(a)				40	118		62		79	51	23	103	181		10
	(b)															
	(c)				40	118		62		79	51	23	103	181		10
8. Colombia	(a)									25	124	52			45	56
	(b)															
	(c)									25	124	52			45	56
9. Denmark	(a)	267	5,304	5,137	534	429	516	240	386	270	5,037	188	207	258	337	180
	(b)															
	(c)	267	5,304	5,137	534	429	516	240	386	270	5,037	188	207	258	337	180
10. Ecuador	(a)			30			159	578	755	408	121	46	52	29		23
	(b)															
	(c)			30			159	578	755	408	121	46	52	29		23
11. Finland	(a)	96	624	199	2,992	124	237	832	748	754	727	730	197	369	398	387
	(b)															
	(c)	96	624	199	2,992	124	237	832	748	754	727	730	197	369	398	387
12. Taiwan	(a)							21	43		38	76	65	73	38	36
	(b)															
	(c)							21	43		38	76	65	73	38	36
13. France	(a)	307	492	528	460	667	603	281	354	276	693	275	378	177	302	221
	(b)															
	(c)	307	492	528	460	667	603	281	354	276	693	275	378	177	302	221
14. Germany	(a)		554	622	843	1,117	761	786	1,140	2,129	1,991	1,326	1,249	2,388	2,082	1,669
(F.R.)	(b)															
	(c)		554	622	843	1,117	761	786	1,140	2,129	1,991	1,326	1,249	2,388	2,082	1,669
15. Germany	(a)									409	65	62			191	340
(D.R.)	(b)															
	(c)									409	65	62			191	340

For explanation of PERIOD, see page 8.

TABLE 6. – NUMBER OF OCEANOGRAPHIC STATIONS
YEARS DATA WERE OBSERVED

NATION	PERIOD	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
1. Argentina	(a)			50	16	204	100	130	378	153			102			
	(b)					29										
	(c)			50	16	233	100	130	378	153			102			
2. Australia	(a)	767	1,297	1,639	341	112	110	87								
	(b)															
	(c)	767	1,297	1,639	341	112	110	87								
3. Belgium	(a)	323	349	335	334	354	348	272	315	99						
	(b)															
	(c)	323	349	335	334	354	348	272	315	99						
4. Brazil	(a)	317	208	275	375	396		373		403	209	305	152	230	92	309
	(b)															
	(c)	317	208	275	375	396		373		403	209	305	152	230	92	309
6. Canada	(a)	1,531	1,946	1,424	1,015	863	1,015	877	606	2,058	2,798	1,085	1,252	695	685	
	(b)	17	167	527	200	563	291	241	1,154	484	697	1,439	1,104	1,020	498	368
	(c)	1,548	2,113	1,951	1,215	1,426	1,306	1,118	1,760	2,542	3,495	2,524	2,356	1,715	1,183	368
7. Chile	(a)	18	78	14			60			38						
	(b)															
	(c)	18	78	14			60			38						
8. Colombia	(a)		228	31	40	192	144	112	26	21						
	(b)															
	(c)		228	31	40	192	144	112	26	21						
9. Denmark	(a)	257	334	288	2,638	2,416	2,152	120	126	220	214	186	272	185		
	(b)															
	(c)	257	334	288	2,638	2,416	2,152	120	126	220	214	186	272	185		
10. Ecuador	(a)								33							
	(b)															
	(c)								33							
11. Finland	(a)	168	492	470	442	451		352	381	408	443					
	(b)															
	(c)	168	492	470	442	451		352	381	408	443					
12. Taiwan	(a)	35			53	199										
	(b)															
	(c)	35			53	199										
13. France	(a)	424	689	877	263	311	119	61	108	238	17	95	* 325	* 647	463	
	(b)															
	(c)	424	689	877	263	311	119	61	108	238	17	95	325	647	463	
14. Germany	(a)	1,369	1,397	1,380	3,090	1,727	1,009	985	1,523	886	1,036	908	1,145	1,080	925	260
(F.R.)	(b)						60		45		90	12	36	14	24	331
	(c)	1,369	1,397	1,380	3,090	1,727	1,069	985	1,568	886	1,126	920	1,181	1,094	949	591
15. Germany	(a)	458	380	388	284	83	588			61						
(D.R.)	(b)															
	(c)	458	380	388	284	83	588			61						

* Adjusted by inventory.

For explanation of PERIOD, see page 8.

TABLE 6. – NUMBER OF OCEANOGRAPHIC STATIONS
YEARS DATA WERE OBSERVED

NATION	PERIOD	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	TOTALS
1. Argentina	(a)																3,063
	(b)																29
	(c)																3,092
2. Australia	(a)																13,385
	(b)																
	(c)																13,385
3. Belgium	(a)																3,348
	(b)																
	(c)																3,348
4. Brazil	(a)	585															6,571
	(b)																
	(c)	585															6,571
6. Canada	(a)																42,623
	(b)	289	133														9,238
	(c)	289	133														51,861
7. Chile	(a)																875
	(b)																
	(c)																875
8. Colombia	(a)																1,096
	(b)																
	(c)																1,096
9. Denmark	(a)																28,698
	(b)																
	(c)																28,698
10. Ecuador	(a)																2,234
	(b)																
	(c)																2,234
11. Finland	(a)																13,021
	(b)																
	(c)																13,021
12. Taiwan	(a)																677
	(b)																
	(c)																677
13. France	(a)																* 10,651
	(b)																
	(c)																10,651
14. Germany	(a)	263															37,640
(F.R.)	(b)	653	205														1,470
	(c)	916	205														39,110
15. Germany	(a)																3,309
(D.R.)	(b)																
	(c)																3,309

* Adjusted by inventory.

For explanation of PERIOD, see page 8.

TABLE 6. – NUMBER OF OCEANOGRAPHIC STATIONS
YEARS DATA WERE OBSERVED

NATION	PERIOD	PRE-1957	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
16. Ghana	(a)									79	57	20	45	111	150	154
	(b)															
	(c)									79	57	20	45	111	150	154
18. Iceland	(a)		15	399	135	245	314	113	278	283	319	441	210	247	258	155
	(b)															
	(c)		15	399	135	245	314	113	278	283	319	441	210	247	258	155
19. India	(a)		243	160	162	65	69	214	269	186	137					
	(b)															
	(c)		243	160	162	65	69	214	269	186	137					
20. Indonesia	(a)	34	104						44	180	127	34	94			81
	(b)															
	(c)	34	104						44	180	127	34	94			81
22. Israel	(a)	109			14	15	31	181	59	93	49	101	169	193	213	87
	(b)															
	(c)	109			14	15	31	181	59	93	49	101	169	193	213	87
23. Italy	(a)		264	405	117	67	140		96	82	23	238	250	185	96	287
	(b)															
	(c)		264	405	117	67	140		96	82	23	238	250	185	96	287
24. Japan	(a)		1,686	2,371	1,522	1,416	2,296	1,735	9,693	15,248	16,189	14,811	15,198	15,234	14,265	14,334
	(b)															
	(c)		1,686	2,371	1,522	1,416	2,296	1,735	9,693	15,248	16,189	14,811	15,198	15,234	14,265	14,334
25. Mexico	(a)												141			53
	(b)															
	(c)												141			53
26. Netherlands	(a)		137	374	356	295	614	539	797	601	58	178	398	141	378	429
	(b)															
	(c)		137	374	356	295	614	539	797	601	58	178	398	141	378	429
27. New Zealand	(a)	20	62	87		9		52		64	38	26	123	70	80	150
	(b)															
	(c)	20	62	87		9		52		64	38	26	123	70	80	150
28. Norway	(a)		1,106	2,169	1,582	1,600	1,630	1,500	1,786	1,443	1,770	1,635	1,374	1,389	1,444	247
	(b)															
	(c)		1,106	2,169	1,582	1,600	1,630	1,500	1,786	1,443	1,770	1,635	1,374	1,389	1,444	247
29. Pakistan	(a)									36			15			
	(b)															
	(c)									36			15			
30. Peru	(a)						249	415	374	535	415	317	274	198	149	143
	(b)															
	(c)						249	415	374	535	415	317	274	198	149	143
31. Philippines	(a)													98	101	
	(b)															
	(c)													98	101	

For explanation of PERIOD, see page 8.

TABLE 6. – NUMBER OF OCEANOGRAPHIC STATIONS YEARS DATA WERE OBSERVED

NATION	PERIOD	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
16. Ghana	(a)	132	148	96	98	96	70	76		124	162					
	(b)															
	(c)	132	148	96	98	96	70	76		124	162					
18. Iceland	(a)	542	381	447	485	488	503	756	755	658	724					
	(b)															
	(c)	542	381	447	485	488	503	756	755	658	724					
19. India	(a)	48	283							258						
	(b)															
	(c)	48	283							258						
20. Indonesia	(a)	325	232	216	113	90	159	60	33	118	52	71	30	24		
	(b)															
	(c)	325	232	216	113	90	159	60	33	118	52	71	30	24		
22. Israel	(a)	121														
	(b)															
	(c)	121														
23. Italy	(a)	63	19			11	98	36								
	(b)															
	(c)	63	19			11	98	36								
24. Japan	(a)	14,289	15,790	14,906	13,414	12,968	12,612	13,155	13,487	12,800	11,944	12,210	12,832	13,005	1,533	1,310
	(b)														11,465	1,502
	(c)	14,289	15,790	14,906	13,414	12,968	12,612	13,155	13,487	12,800	11,944	12,210	12,832	13,005	12,998	2,812
25. Mexico	(a)	497	233	40	162			14	332							
	(b)															
	(c)	497	233	40	162			14	332							
26. Netherlands	(a)	865	473	200	53	414	29	12	17	20	76	14	17	17		
	(b)															
	(c)	865	473	200	53	414	29	12	17	20	76	14	17	17		
27. New Zealand	(a)	25		33	10	29	49	187	98							
	(b)															
	(c)	25		33	10	29	49	187	98							
28. Norway	(a)	252	156	241	185	122	125								68	
	(b)															
	(c)	252	156	241	185	122	125								68	
29. Pakistan	(a)	123														
	(b)															
	(c)	123														
30. Peru	(a)	174	184	55	141	86	209	22		68		8				
	(b)															
	(c)	174	184	55	141	86	209	22		68		8				
31. Philippines	(a)															
	(b)															
	(c)															

For explanation of PERIOD, see page 8.

TABLE 6. – NUMBER OF OCEANOGRAPHIC STATIONS
YEARS DATA WERE OBSERVED

NATION	PERIOD	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	TOTALS
16. Ghana	(a)																1,618
	(b)																
	(c)																1,618
18. Iceland	(a)																9,151
	(b)																
	(c)																9,151
19. India	(a)																2,094
	(b)																
	(c)																2,094
20. Indonesia	(a)																2,221
	(b)																
	(c)																2,221
22. Israel	(a)																1,435
	(b)																
	(c)																1,435
23. Italy	(a)																2,477
	(b)																
	(c)																2,477
24. Japan	(a)	472															302,725
	(b)	1,356	640	5													14,968
	(c)	1,828	640	5													317,693
25. Mexico	(a)																1,472
	(b)																
	(c)																1,472
26. Netherlands	(a)																7,502
	(b)																
	(c)																7,502
27. New Zealand	(a)																1,212
	(b)																
	(c)																1,212
28. Norway	(a)																21,824
	(b)																
	(c)																21,824
29. Pakistan	(a)																174
	(b)																
	(c)																174
30. Peru	(a)																4,016
	(b)																
	(c)																4,016
31. Philippines	(a)																199
	(b)																
	(c)																199

For explanation of PERIOD, see page 8.

TABLE 6. – NUMBER OF OCEANOGRAPHIC STATIONS
YEARS DATA WERE OBSERVED

NATIO	PERIOD	PRE-1957	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
32. Poland	(a)		280	500	481	367	296	356	360	616	407	508	650	137	873	482
	(b)															
	(c)		280	500	481	367	296	356	360	616	407	508	650	137	873	482
33. Portugal	(a)									90	28	154		85	234	286
	(b)															
	(c)									90	28	154		85	234	286
34. Spain	(a)						105	131	46	60						
	(b)															
	(c)						105	131	46	60						
35. Sweden	(a)		1,642	1,662	2,007	1,916	1,908	1,670	1,565	2,005	1,644	1,632	422	1,530	1,380	1,580
	(b)															
	(c)		1,642	1,662	2,007	1,916	1,908	1,670	1,565	2,005	1,644	1,632	422	1,530	1,380	1,580
36. South Africa	(a)			606	735	834	797	1042	937	895	821	758	412	151	130	
	(b)															
	(c)			606	735	834	797	1,042	937	895	821	758	412	151	130	
37. U.S.S.R.	(a)	172	1,251	1,684	2,115	1,506	1,249	1,155	781	1,604	3,192	2,851	2,259	2,185	2,739	4,435
	(b)															
	(c)	172	1,251	1,684	2,115	1,506	1,249	1,155	781	1,604	3,192	2,851	2,259	2,185	2,739	4,435
38. United Kingdom	(a)		1,486	1,616	1,788	2,326	1,904	1,940	1,267	1,136	1,016	443	305	385	163	74
	(b)											26				
	(c)		1,486	1,616	1,788	2,326	1,904	1,940	1,267	1,136	1,016	469	305	385	163	74
39. United States	(a)	1,272	3,564	2,777	4,510	3,200	4,112	3,418	5,833	6,406	6,482	6,295	8,004	7,999	10,038	6,767
	(b)															
	(c)	1,272	3,564	2,777	4,510	3,200	4,112	3,418	5,833	6,406	6,482	6,295	8,004	7,999	10,038	6,767
42. Yugoslavia	(a)	724	260	161	75	142	162	148	314	248	217	254	151	152	146	154
	(b)															
	(c)	724	260	161	75	142	162	148	314	248	217	254	151	152	146	154
43. Korea	(a)		231	779	1300	764	741	817	453	1040	1239	960	1884	2155	2439	1659
(Republic of)	(b)															
	(c)		231	779	1,300	764	741	817	453	1,040	1,239	960	1,884	2,155	2,439	1,659
44. Ivory Coast	(a)				137	187	55	104	109	142		372	239	130	155	713
	(b)															
	(c)				137	187	55	104	109	142		372	239	130	155	713
45. Nigeria	(a)								513	484						
	(b)															
	(c)								513	484						
46. Congo	(a)	56							94	18	145	98	101	215	324	178
(People's Republic)	(b)															
	(c)	56							94	18	145	98	101	215	324	178
47. Malaysia	(a)															130
	(b)															130
	(c)															

For explanation of PERIOD, see page 8.

TABLE 6. -- NUMBER OF OCEANOGRAPHIC STATIONS
YEARS DATA WERE OBSERVED

NATION	PERIOD	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
32. Poland	(a)	222	351	518	258	173	70	110		77	87					
	(b)															
	(c)	222	351	518	258	173	70	110		77	87					
33. Portugal	(a)	469	258	321	148			37		18	43	20	12			
	(b)															
	(c)	469	258	321	148			37		18	43	20	12			
34. Spain	(a)	48	30	206	115	35	104				60		18			
	(b)															
	(c)	48	30	206	115	35	104				60		18			
35. Sweden	(a)	1,194	1,695	1,035	822	1174	1124	1171	937	681	852	917	761	644	906	469
	(b)															
	(c)	1,194	1,695	1,035	822	1,174	1,124	1,171	937	681	852	917	761	644	906	469
36. South Africa	(a)	97	74	43	180			114								
	(b)															
	(c)	97	74	43	180			114								
37. U.S.S.R.	(a)	5,357	6,042	5,452	6,903	2,079	4,783	6,063	6,043	8,213	5,871	2,318	2,830	1,213	461	115
	(b)							113		17	21	156	207	2,359	1,974	520
	(c)	5,357	6,042	5,452	6,903	2,079	4,783	6,176	6,043	8,230	5,892	2,474	3,037	3,572	2,435	635
38. United Kingdom	(a)	307	453	608	153	227	188		52	116		33	34	87		19
	(b)														38	15
	(c)	307	453	608	153	227	188		52	116		33	34	87	38	34
39. United States	(a)	7235	8,929	6,545	6,239	5,414	3,744	4,315	4,451	4,456	2,129	3,251	995	1,443	2,291	1,264
	(b)			208	155		99					247		94		751
	(c)	7,235	8,929	6,753	6,394	5,414	3,843	4,315	4,451	4,456	2,129	3,498	995	1,537	2,291	2,015
42. Yugoslavia	(a)		117	204	34	66	78									
	(b)															
	(c)		117	204	34	66	78									
43. Korea	(a)	1,725	1,786	2,840	39	1,071	1,137	1,159	1,204	1,103	1,072	1,008	1,242		1,081	1,422
(Republic of)	(b)												204			
	(c)	1,725	1,786	2,840	39	1,071	1,137	1,159	1,204	1,103	1,072	1,008	1,446		1,081	1,422
44. Ivory Coast	(a)	8	50	316	157	78										
	(b)															
	(c)	8	50	316	157	78										
45. Nigeria	(a)															
	(b)															
	(c)															
46. Congo	(a)	123	301	333	376	350	312	483	557	415	416	266	126			
(People's Republic)	(b)															
	(c)	123	301	333	376	350	312	483	557	415	416	266	126			
47. Malaysia	(a)	20														
	(b)															
	(c)	20														

For explanation of PERIOD, see page 8.

TABLE 6. – NUMBER OF OCEANOGRAPHIC STATIONS
YEARS DATA WERE OBSERVED

NATION	PERIOD	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	TOTALS
32. Poland	(a)																8,179
	(b)																
	(c)																8,179
33. Portugal	(a)																2,203
	(b)																
	(c)																2,203
34. Spain	(a)																958
	(b)																
	(c)																958
35. Sweden	(a)																36,945
	(b)																
	(c)																36,945
36. South Africa	(a)																8,626
	(b)																
	(c)																8,626
37. U.S.S.R.	(a)	357															93,278
	(b)		60														5,427
	(c)	357	60														98,705
38. United Kingdom	(a)	22	10														18,158
	(b)	31	118														228
	(c)	53	128														18,386
39. United States	(a)	950	166														144,494
	(b)		135														1,689
	(c)	950	301														146,183
42. Yugoslavia	(a)																3,807
	(b)																
	(c)																3,807
43. Korea	(a)	15	93														34,458
(Republic of)	(b)	838	64	277													1,383
	(c)	853	157	277													35,841
44. Ivory Coast	(a)																2,952
	(b)																
	(c)																2,952
45. Nigeria	(a)																997
	(b)																
	(c)																997
46. Congo	(a)																5,287
(People's Republic)	(b)																
	(c)																5,287
47. Malaysia	(a)																150
	(b)																
	(c)																150

For explanation of PERIOD, see page 8.

TABLE 6. -- NUMBER OF OCEANOGRAPHIC STATIONS
YEARS DATA WERE OBSERVED

NATION	PERIOD	PRE-1957	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
48. Malagasy	(a)			6	5			161	45	24		42	83	54		131
Republic	(b)															
	(c)			6	5			161	45	24		42	83	54		131
49. Morocco	(a)			9												
	(b)															
	(c)			9												
50. Senegal	(a)			13				42				20	218	349	339	317
	(b)															
	(c)			13				42				20	218	349	339	317
51. Thailand	(a)												670	559	94	78
	(b)															
	(c)												670	559	94	78
53. Venezuela	(a)								109		43	126	53	91		72
	(b)															
	(c)								109		43	126	53	91		72
60. Cuba	(a)											12	58	91	43	60
	(b)															
	(c)											12	58	91	43	60
63. Romania	(a)											22	42	37	24	
	(b)															
	(c)											22	42	37	24	
64. Arab Republic	(a)											115				34
of Egypt	(b)															
	(c)											115				34
71. Tunisia	(a)															
	(b)															
	(c)															
73. China	(a)															
(People's Republic)	(b)															
	(c)															
75. Mauritania	(a)															
	(b)															75
	(c)															75
TOTALS	(a)	3,093	19,977	23,561	23,942	19,523	22,560	22,059	32,805	40,157	45,781	37,515	39,567	42,650	43,435	38,881
	(b)					22	24					26				
	(c)	3,093	19,977	23,561	23,942	19,545	22,584	22,059	32,805	40,157	45,781	37,541	39,567	42,650	43,435	38,881

For explanation of PERIOD, see page 8.

TABLE 6. – NUMBER OF OCEANOGRAPHIC STATIONS
YEARS DATA WERE OBSERVED

NATION	PERIOD	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
48. Malagasy	(a)	176	142	131	142	34										
Republic	(b)															
	(c)	176	142	131	142	34										
49. Morocco	(a)															
	(b)															
	(c)															
50. Senegal	(a)	254	243													
	(b)															
	(c)	254	243													
51. Thailand	(a)	248	290	134												
	(b)															
	(c)	248	290	134												
53. Venezuela	(a)		107	144												
	(b)															
	(c)		107	144												
60. Cuba	(a)	83	148	157					40							
	(b)															
	(c)	83	148	157					40							
63. Romania	(a)	35	18	20	15	20	20	18	20	18	19	17	10			
	(b)															
	(c)	35	18	20	15	20	20	18	20	18	19	17	10			
64. Arab Republic	(a)	123														
of Egypt	(b)															
	(c)	123														
71. Tunisia	(a)		157													
	(b)															
	(c)		157													
73. China	(a)								8	311		255		55	55	
(People's Republic)	(b)															
	(c)								8	311		255		55	55	
75. Mauritania	(a)	214	122													
	(b)															
	(c)	214	122													
TOTALS	(a)	41,061	46,610	42,412	39,133	32,333	31,059	31,157	31,530	34,039	28,224	22,967	*22,155	*19,325	8,560	5,168
	(b)	17	167	735	355	592	450	354	1,199	501	808	1,854	1,551	3,487	13,999	3,487
	(c)	41,078	46,777	43,147	39,488	32,925	31,509	31,511	32,729	34,540	29,032	24,821	23,706	22,812	22,559	8,655

* Adjusted by inventory.

For explanation of PERIOD, see page 8.

TABLE 6. – NUMBER OF OCEANOGRAPHIC STATIONS
YEARS DATA WERE OBSERVED

NATION	PERIOD	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	TOTALS
48. Malagasy	(a)																1,176
Republic	(b)																
	(c)																1,176
49. Morocco	(a)																9
	(b)																
	(c)																9
50. Senegal	(a)																1,795
	(b)																
	(c)																1,795
51. Thailand	(a)																2,073
	(b)																
	(c)																2,073
53. Venezuela	(a)																745
	(b)																
	(c)																745
60. Cuba	(a)																692
	(b)																
	(c)																692
63. Romania	(a)																355
	(b)																
	(c)																355
64. Arab Republic	(a)																272
of Egypt	(b)																
	(c)																272
71. Tunisia	(a)																157
	(b)																
	(c)																157
73. China	(a)	158															842
(People's Republic)	(b)																
	(c)	158															842
75. Mauritania	(a)																411
	(b)																
	(c)																411
TOTALS	(a)	2,822	269														* 894,330
	(b)	3,167	1,355	282													34,432
	(c)	5,989	1,624	282													928,762

* Adjusted by inventory.

For explanation of PERIOD, see page 8.

Bathythermograph Data Base

Table 7 summarizes the number of bathythermograph observations received since 1957 from the nation under which the data were catalogued. The number of cruises on which the data were observed is also listed. A total of 504,744 bathythermograph observations were taken during 7,828 cruises.

Table 7. -- Number of bathythermograph observations received by WDC-A, Oceanography, from various nations.

Nation	No. of cruises	Type of data format				Total
		Mechanical BT		Expendable BT		
		Analog	Tabular	Analog	Tabular	
1. Argentina	74	4,050	3,688	--	256	7,994
2. Australia	617	--	9,460	1	20,848	30,309
3. Belgium	2	--	15	--	--	15
4. Brazil	7	43	85	--	485	613
6. Canada	1,677	21,248	469	--	44,580	66,297
7. Chile	8	846	--	--	165	1,011
8. Colombia	2	316	--	--	--	316
9. Denmark	2	70	--	--	--	70
11. Finland	2	124	168	--	--	292
13. France	140	352	--	--	3,412	3,764
14. Germany (F.R.)	289	59	14,059	--	9,082	23,200
16. Ghana	1	12	--	--	--	12
18. Iceland	50	124	7,075	--	--	7,199
19. India	2	--	351	--	522	873
20. Indonesia	13	162	118	--	--	280
23. Italy	24	879	561	72	282	1,794
24. Japan	2,712	--	163,392	--	38,982	202,374
25. Mexico	7	--	--	--	269	269
26. Netherlands	23	675	--	--	--	675
28. Norway	2	82	158	--	--	240
29. Pakistan	2	--	65	--	--	65
31. Philippines	1	--	--	--	8	8
32. Poland	7	--	153	--	279	432
33. Portugal	24	448	2,725	12	194	3,379
34. Spain	6	194	--	--	225	419
35. Sweden	2	10	57	--	--	67
36. South Africa	1	--	--	--	56	56
37. U.S.S.R.	111	428	12,024	--	5,250	17,702
38. Unitd Kingdom	1,313	270	44,763	--	12,046	57,079
39. United States	627	36,114	3,489	646	30,622	70,871
43. Korea (Rep. of)	26	--	1,427	--	--	1,427
44. Ivory Coast	6	618	--	--	--	618
45. Nigeria	6	1,011	20	--	--	1,031
46. Congo (People's Republic)	21	2,389	83	--	--	2,472
48. Malagasy Republic	10	476	--	--	--	476
50. Senegal	8	730	--	--	--	730
70. Sierra Leone	2	194	--	--	--	194
71. Tunisia	1	--	121	--	--	121
TOTAL	7,828	71,924	264,526	731	167,563	504,744

Biological Data Base

Table 8 shows, by nation, the number of biological observations received by this center since its inception. A total of 135,638 observations, including plankton observations, primary productivity measurements, pigment concentration measurements, carbon-14 measurements and fishery observations were taken during 1,662 cruises.

Table 8. --Number of biological observations received by WDC-A, Oceanography from various nations

Nation	No. of cruises	Type of observation				
		Plankton	Primary Productivity	Pigments	C-14	Fishery
1. Argentina	13	452	47	233	129	--
2. Australia	63	1,527	1,599	1,738	--	2,427
4. Brazil	16	754	--	175	--	36
6. Canada	52	1,319	669	1,234	47	100
8. Colombia	7	181	--	496	--	--
10. Ecuador	3	895	191	116	--	--
12. Taiwan	2	98	--	98	--	--
13. France	25	720	288	449	43	92
14. Germany (F.R.)	11	122	65	877	649	652
15. Germany (D.R.)	9	199	103	1,717	819	--
19. India	12	424	--	--	--	--
20. Indonesia	57	1,770	5	573	--	7
22. Israel	1	58	--	--	--	--
24. Japan	940	31,810	180	15,641	30	5,800
25. Mexico	6	111	13	404	--	--
27. New Zealand	1	46	--	69	71	--
29. Pakistan	1	14	--	--	--	--
30. Peru	1	28	3	27	10	--
32. Poland	1	--	--	81	--	--
33. Portugal	5	351	--	128	--	57
34. Spain	6	66	87	102	--	27
35. Sweden	1	--	18	--	--	--
36. South Africa	19	985	155	11	--	--
37. U.S.S.R.	12	3,837	743	262	--	389
38. United Kingdom	3	416	--	--	--	--
39. United States	268	9,435	5,101	10,579	745	4,445
42. Yugoslavia	1	167	--	--	--	--
43. Korea (Rep. of)	78	15,296	--	--	--	--
44. Ivory Coast	3	27	7	--	--	1
45. Nigeria	6	5	4	--	--	2,018
46. Congo (People's Republic	4	24	93	70	--	1
48. Malagasy Rep.	9	84	54	54	--	--
50. Senegal	11	34	--	477	--	258
60. Cuba	1	--	37	--	--	--
63. Romania	10	261	--	--	--	--
64. Arab Republic of Egypt	2	--	--	--	--	188
71. Greece	1	3	4	--	--	--
75. Mauritania	1	--	--	--	--	1
TOTAL	1,662	71,519	9,466	35,611	2,543	16,499

Surface and Subsurface Current Data Base

Table 9 summarizes, by nation, the number of surface and subsurface current measurements received by this Center since its inception. The total of 649,078 current measurements includes 99,531 subsurface and 549,647 surface measurements taken during 3,776 cruises.

Table 9. -- Number of surface and subsurface current measurements received by WDC-A, Oceanography from various nations.

Nation	No. of cruises	Subsurface	Surface
2. Australia	50	1,663	--
4. Brazil	1	83	--
6. Canada	19	1,558	836
9. Denmark	62	--	20,184
10. Ecuador	1	46	9
11. Finland	6	5,472	5,708
13. France	20	6,450	632
14. Germany (F.R.)	104	10,025	317,727
15. Germany (D.R.)	4	769	47
20. Indonesia	13	177	40
23. Italy	2	782	--
24. Japan	3,198	5,100	172,750
26. Netherlands	21	10,242	--
28. Norway	6	2,691	86
32. Poland	2	291	--
33. Portugal	4	74	--
35. Sweden	116	22,751	24,237
37. U.S.S.R.	48	20,660	1,507
38. United Kingdom	4	19	258
39. United States	58	4,493	4,940
42. Yugoslavia	12	520	81
43. Korea (Rep. of)	2	--	284
44. Ivory Coast	3	44	140
46. Congo (People's Republic)	3	218	--
48. Malagasy Republic	1	24	24
52. Turkey	1	5,095	40
63. Romania	19	284	17
Total	3,776	99,531	549,547

INTERNATIONAL INVENTORIES AND CATALOGUES

Report of Observations/Samples Collected by Oceanographic Programs (ROSCOP)

The Report of Observations/Samples Collected by Oceanographic Programs (ROSCOP) system is an international marine data inventory system which provides World Data Centers, Oceanography, and other inventory centers with a means for determining the availability of internationally exchangeable data in advance of the actual receipt and cataloguing of the data by the data center. This system is also useful in providng a referral service to data not routinely exchanged through the WDC system and has proved useful to the WDC's in providing supplemental information in the servicing of routine data requests. In addition, the system represents a useful tool for supplying additional information during cataloguing of the data and subsequent processing by regional and national centers. In a number of instances, individuals have utilized information from the ROSCOP system provided by WDC-A to request data from the originator that were not yet available from the WDC's.

A total of 710 ROSCOP II forms were received by this Center during 1988. Table 10 tabulates the cruises reported by ROSCOP II forms. As of 31 December, ROSCOP forms describing 17,890 cruises had been received. These cruises are tabulated by nation for ROSCOP I in table 11 and ROSCOP II in table 12. ROSCOP forms have now been received from 34 nations. All ROSCOP forms received by either WDC-A or WDC-B, Oceanography, are routinely copied to the counterpart World Data Center.

International Catalogue of Ocean Data Stations

WDC-A, Oceanography, is one of four regional data organizations that has assisted the IOC in compiling and maintaining the International Catalogue of Ocean Data Stations, which replaced the IOC booklet "Fixed Oceanographic Stations of the World" published by UNESCO in 1963. The Catalogue includes a descriptive listing or index of ocean data stations.

The IOC has initiated a revision of the Catalogue in response to proposals made by the CCCO and the Technical Committee on IODE. Cooperating organizations responsible for maintaining information about long time series oceanographic measurements have provided up-to-date information on these data sets to IOC. The IOC will publish a "Manual on Long Oceanographic Time Series".

Table 10. -- Number of cruises for which ROSCOP II forms were received by WDC-A, Oceanography, during 1988

Nation	Ship	Cruises	Cruises for which various data were reported: Meteorology	Hydrography	Pollution	Geology and Geophysics	Dynamics	Biology
1. Argentina	PUERTO DESEADO	2	1	2		2	1	
	BAHIA BLANCA	5	5	5		1		3
	CAPITAN CANEPA	4	4	4		1		3
	CAPITAN CANEPA II	1	1	1				
2. Australia	FRANKLIN	4	3	3	1	3	3	1
	COOK	3	3	3		3	1	
6. Canada	HUDSON	4		2		2	2	
	DAWSON	9		5	1	7	1	1
	BAFFIN	1		1			1	
	PANDORA/PIECES IV	2			1	2	1	1
	PRINCE	5	2	2				4
	PANDORA II/ PIECES IV	1		1		1		1
	NAVICULA	2		1	1	1	1	2
	ALFRED NEEDLER	1		1				1
	LADY HAMMOND	5	2	5				4
13. France	LE NOROIT	8		6	1	5	3	5
	JEAN CHARCOT	26	1	5		24		4
	CORIOLIS	12	4	5	1	8	4	8
	CRYOS	5	1	3	1	2	1	3
	MARION DUFRESNE	13	4	10		8	4	5
	ANDRE NIZERY	15		9		7	2	11
	THALASSA	7	2	6		1	2	7
	ROSELYS	3	1	2				3
	LA PELAGIA	11		4	1			11

Table 10. -- Number of cruises for which ROSCOP II forms were received by WDC-A, Oceanography, during 1988 (continued)

Nation	Ship	Cruises	Cruises for which various data were reported					
			Meteorology	Hydrography	Pollution	Geology and Geophysics	Dynamics	Biology
13. France (continued)	GWEN DREZ	8			1	2		7
	CAPRICORNE	4		4			1	3
	SUROIT	13	1	4		10	1	3
	VAUBAN	5				5		1
	ALIS	2	1	1		1	1	2
	NADIR	7		4		6		3
	NUROIT/CYANA	1						1
14. Germany (F.R.)	POLARSTERN	4	4	4	1	1	2	4
	UTHOERN	14		14				
	GAUSS	5		4	3	4	1	1
	SOLEA	13		4	2	1		13
	POSEIDON	6	1	5		1	2	2
	METEOR	7	4	7	3	2	4	5
	MONTE ROSA	8		8				
	SONNE	4		3	1	3		
	VALDIVIA	14	4	11	2	5	3	3
	WALTHER HERWIG	7	1	6		2		7
	FRIEDRICH HEINCKE	8		6	2		1	8
	ATAIR	1		1	1	1		
	MEERKATZ	1		1				
	VICTOR HANSEN	4		1	3	3		
	HELGOLAND REEDE	1		1				
	ALTE. LIEBE CUXHAVEN	1		1				
	TEREDO VERSUCHS-STAND	1		1				
	PLANET	8		4		7		

Table 10. -- Number of cruises for which ROSCOP II forms were received by WDC-A, Oceanography, during 1988 (continued)

Nation	Ship	Cruises	Cruises for which various data were reported: Meteorology	Hydrography	Pollution	Geology and Geophysics	Dynamics	Biology
14. Germany (F.R.) (continued)	ALKOR	1		1				
	LITTORINA	1		1				
	HAITHABU	1		1				
	SCHWEDENECK	1		1				
24. Japan	HAKUREI MARU	8				8		
	SHUMPU MARU	5	5	5	4		5	4
	KOFU MARU	5	5	5	5		5	5
	SEIFU MARU	3	3	3	3		3	3
	SHOYO	4		4			4	
	KAIYO	6		6			6	
	RYOFU	6	6	6	5		5	5
	YOKO MARU	2	2	2				2
	CHOFU MARU	4	4	4	3		4	3
	TANSEI MARU	1				1		
	SHUNYO MARU	1	1	1	1		1	1
	TAKUYO	1		1	1	1	1	
	KAIUN MARU	1	1	1				1
	TOO MARU	7	7	7				7
	SEIHO MARU	3	3	3				3
35. Sweden	Coast Guard Vessel	28	28	28				
	Icebreakers	9	9	9				
	ARGOS	15	15	15	9	1	1	8
	Coast Guard Airplane	1		1				
	SVANIC	1	1	1			1	
	TV 71	1					1	

Table 10. -- Number of cruises for which ROSCOP II forms were received by WDC-A, Oceanography, during 1988 (continued)

Nation	Ship	Cruises	Cruises for which various data were reported: Meteorology	Hydrography	Pollution	Geology and Geophysics	Dynamics	Biology
35. Sweden (continued)	ANCYLUS	1	1	1				
	SENSOR	1	1	1				
36. South Africa	MERING NAUDE	17	2	8	5	5	4	12
	ALGULHAS	4	4	4	1	3		4
	AFRICANA	3	2	3				3
	T. B. DAVIE	2				2		
	SARDINOPS	1						1
37. U.S.S.R.	ERNST KRENKEL	2	2	2	2			
	ARNOLD VEIMER	1	1	1			1	1
	GEORGII USHAKOV	1	1	1	1		1	
	RUDOLF SAMOYLOVITCH	1	1	1	1		1	
	OKEAN	1	1	1				
	AKAD. A. NESMEYANOV	2	1	1	1	1		1
	AKAD. KOROLEV	2	1	2	1	2	1	
	MUSSON	2	2	2	2		2	
	YAKOV GAKKEL	1	1	1	1		1	1
	PASSAT	5	5	5	5		1	
38. United Kingdom	FREDERIC RUSSELL	19	3	14	2	4	10	13
	CHALLENGER	24	5	22	4	9	19	14
	CHARLES DARWIN	15	1	6		11	5	1
	DISCOVERY	15	2	11	2	12	6	6
	G. A. REAY	2		2	1		1	2
	SCOTIA	13		9	4		4	12

Table 10. -- Number of cruises for which ROSCOP II forms were received by WDC-A, Oceanography, during 1988 (continued)

Nation	Ship	Cruises	Cruises for which various data were reported: Meteorology	Hydrography	Pollution	Geology and Geophysics	Dynamics	Biology
38. United Kingdom (continued)	CLUPEA	2		1	1			2
	Goldseeker	2		2				2
	DAWN SKY	1						1
	BRITISH VIKING	3		2	1			3
	CIROLANA	11		9	3	4	3	8
	CLIONE	19		10	6	5	3	15
39. United States	POLAR STARR	1	1	1	1	1	1	1
	NOAA Twin Otter	1						1
	MILLER FREEMAN	1		1				1
	WECOMA	12	2	9		1	4	9
	AMBASSADOR	6		6				
	OREGON II	4	1	3		3	2	4
	DELAWARE II	2	2	2			2	2
	CHAPMAN	5	3	5		1	2	5
	ENDEAVOR	11	2	10		1	7	9
	CALANUS	12		7		2	1	9
	CAPE HATTERAS	9	3	8	1	4	2	6
	Ship not identified	1	1			1	1	
	ALPHA HELIX	6		6		3	3	5
	Joides Resolution	4	2	1		4	2	
	WHITING	2	1	2		1	2	
	T. WASHINGTON	2	1	1	1	1	1	1
	Helicopter	2					1	1
	OCEANOGRAPHER	5	3	5		2	4	3
	DAVID STARR JORDAN	4	2	4	1		3	4

Table 10. -- Number of cruises for which ROSCOP II forms were received by WDC-A, Oceanography, during 1988 (continued)

Nation	Ship	Cruises	Cruises for which various data were reported					
			Meteorology	Hydrography	Pollution	Geology and Geophysics	Dynamics	Biology
39. United States (continued)	MCARTHUR	1		1			1	1
	PELICAN	6	5	6	3		6	
	R. G. SPROUL	9		4		2	2	3
	XIANGYANGHONG	1		1			1	1
	NEW HORIZON	3		2		2		1
	COLUMBUS ISELIN	6				1		5
	T. G. THOMPSON	3	1	3			2	3
	NOAA Vessel 1273	1		1				1
	MELVILLE	1		1			1	1
	ALBATROSS IV	1	1	1			1	1
	JUSTO SIERRA	1		1				
	Aircraft	2		2				

Table 11. -- Number of cruises for which ROSCOP I forms have been received by WDC-A, Oceanography, as of 31 December 1988

Nation	No. of cruises	Cruises for which various data were reported					
		Descriptive oceanography	Current measurements	Meteorology	Geology and Geophysics	Biology	Other observations
1. Argentina	1	1		1			
2. Belgium	15	14	3	14	12	10	4
6. Canada	63	54	16	26	23	25	23
8. Colombia	9	9		9			
9. Denmark	41	40	2	20		18	10
10. Ecuador	6	3	3	3	2	3	1
11. Finland	27	27		18	9	19	11
13. France	98	67	18	46	47	50	34
13. France with Malagasy Republic	2	2		2		2	
14. Germany (F.R.)	497	340	49	36	125	329	200
15. Germany (D.R.)	16	16	5	16		14	11
18. Iceland	39	38	14	36	2	22	1
19. India	32	32				29	
21. Ireland	12	12		4		8	8
23. Italy	3	3	2	2			1
24. Japan	214	193	91	146	23	104	14
26. Netherlands	78	75	18	34			22
28. Norway	108	105	8	48	17	99	24
30. Peru	3	3	2	3		3	1
32. Poland	82	82	18	19	8	57	13
34. Spain	35	33	23	14		8	5
35. Sweden	38	35	3	26	7	19	21
37. U.S.S.R.	85	85	16	65	8	4	8
38. United Kingdom	616	354	143	151	135	391	254
39. United States	20	14	2	15	19	7	17
43. Korea (Rep. of)	8	8		8			

(continued)

Table 11. -- Number of cruises for which ROSCOP I forms have been received by WDC-A, Oceanography, as of 31 December 1988 (continued)

Nation	No. of cruises	Cruises for which various data were reported					
		Descriptive oceanography	Current measurements	Meteorology	Geology and Geophysics	Biology	Other observations
46. Congo (People's Republic)	16	16	2	11	1	13	15
50. Senegal	1						
75. Mauritania	2	2		1		2	
Total	2,163	1,661	438	834	438	1,236	698

Table 12. -- Number of cruises for which ROSCOP II forms have been received by WDC-A, Oceanography, as of 31 December 1988

Nation	No. of cruises	Cruises for which various data were reported					
		Meteorology	Hydrography	Pollution	Geology and Geophysics	Dynamics	Biology
1. Argentina	132	101	116		94	46	81
2. Australia	71	54	66	5	56	21	24
3. Belgium	13	12	13	11	10	10	13
4. Brazil	93	77	87	15	77	32	61
6. Canada	218	27	155	24	94	108	76
7. Chile	1	1	1				
9. Denmark	223	16	199	62	10	82	152
11. Finland	107	20	104	39	15	9	64
13. France	2,309	444	1,208	389	929	390	1,213
14. Germany (F.R.)	1,180	193	883	180	297	158	636
15. Germany (D.R.)	126	114	120	13	3	17	76
16. Ghana	2	2	1		1		1
18. Iceland	122	110	94	6	1	1	3
19. India	8	7	8	3	4	1	7
21. Ireland	43	34	39	14	4	5	42
24. Japan	1,456	898	1,339	340	207	744	862
26. Netherlands	295	109	201	30	77	57	96
28. Norway	404	7	393	43	5	22	381
32. Poland	100	100	97	37	6	72	28
33. Portugal	1					1	
34. Spain	15	2	6	2	1	3	8
35. Sweden	171	167	167	56	6	15	73
36. South Africa	462	276	343	89	112	239	221
37. U.S.S.R.	366	317	347	209	56	202	29
38. United Kingdom	2,101	231	1,071	292	696	506	1,291
39. United States	5,675	1,245	3,634	765	1,894	1,355	3,397
43. Korea (Rep. of)	32	27	30	3	3	30	24
46. Congo (People's Republic)	1				1		
Total	15,727	4,591	10,722	2,627	4,659	4,126	8,859

INTERNATIONAL DATA MANAGEMENT ACTIVITIES

RNODC/Integrated Global Ocean Services System (IGOSS)

The U.S. NODC, serving as an RNODC/IGOSS, has implemented an IGOSS Data Management System providing services for near real-time bathythermograph message data received from Member States of the IGOSS Observing System. After receipt, these data are inventoried, processed for duplication, and archived. WDC-A receives assistance from the RNODC/IGOSS in providing data services (data summaries, inventories, graphic plots, etc.) from the IGOSS data base.

RNODC/FGGE Operational Year (FOY)

NODC, serving as the RNODC/FOY has compiled a Global Ocean Climate Data Base containing all available Nansen cast, STD/CTD, XBT, and current measurement data collected worldwide during the FOY period (1 September 1978 - 29 February 1980). The FOY data set includes data for 10,413 oceanographic stations, 4,030 STD/CTD measurements, 28,733 XBT observations, and 294 months of current meter observations. These data have been processed by the RNODC, converted to the GF-3 format, and are available as standard data products from NODC and WDC-A; complete inventories describing these data products are also available.

The RNODC/MEDALPEX Sea Level Data Set

The Intergovernmental Oceanographic Commission (IOC), at its Ninth Session, decided to support the development of an oceanographic program in the Mediterranean during the GARP Alpine Experiment (ALPEX). The MEDALPEX project took place between 1 September 1981 and 30 September 1982, with a special period of observation from 15 February 1982 to 30 April 1982. It was a multi-national project involving scientists from 7 countries. The main purpose of MEDALPEX was to increase understanding of the effect of wind forcing on the dynamics of the western part of the Mediterranean Basin. The measurement of sea level was considered to be an important component of the observation program to support this experiment.

The Permanent Service for Mean Sea Level (PSMSL) was requested by IOC to fulfil the role of the Responsible National Oceanographic Data Centre for MEDALPEX sea level data. The work was undertaken on behalf of PSMSL by the U.K.'s Marine Information and Advisory Service (MIAS). Sea level data were submitted to MIAS from 29 MEDALPEX sites. In compiling the data set, MIAS translated all incoming data into a common format with elevation values standardized to meters and times to GMT. The data for each site were

plotted out as a time series and checks were carried out for gaps or constant values, spikes, spurious data or punching errors. Further checks were carried out by tidally analysing and low pass filtering the data. The complete data set, prepared by the RNODC/MEDALPEX Sea Level Data, is available upon request from WDC-A, Oceanography on a single magnetic tape formatted in GF-3.

The RNODC/Southern Oceans Data Set

The RNODC/Southern Oceans (RNODC/SOC) was created under guidelines set forth by the TC/IODE to provide a regional data management and data information service for Southern Oceans physical and chemical oceanographic data. The RNODC/SOC is located in and operated by the Argentine Oceanographic Data Center (CEADO). The Center acquires, quality controls, and stores in standard format the physical and chemical data obtained from cruises and research programs carried out in the Southern Oceans. The Southern Oceans data set contains data for all available oceanographic stations taken between 50°S and the Antarctic Continent; data for a total of 9,161 stations taken during 248 cruises from 14 countries are currently included. CEADO is responsible for supplying the WDC's Oceanography with a complete Southern Oceans data set on magnetic tape on a regular basis.

TOGA Tropical Ocean Subsurface Thermal Data Set

The TOGA Tropical Ocean Subsurface Thermal Data Centre in Brest operates within the framework of both the IOC's IODE system and the Joint IOC-WMO's IGOSS system. The Centre collects ocean temperature observations for the tropical Atlantic and Indian Oceans (30°N-30°S) as recorded by XBT profiles, observations from drifting or moored buoys with thermistor chains, vertical profiles of temperature and salinity from Nansen casts and CTD/STD casts, and observations from various other temperature profiling devices. Initially, data are collected from radio transmissions, with fully digitized and quality-controlled observations added with time. From these data, the Centre produces quality controlled Level II-B subsurface data sets for the tropical oceans for the ten-year period (1985-1994). The Centre is also responsible for provision of these data sets on magnetic tape in GF-3 format to other TOGA Data Centres and to the World Data Centers, Oceanography.

WDC-A, Oceanography serves as an archival center for the TOGA Subsurface Thermal Data Sets. Its responsibilities are to provide TOGA data sets to requesters in the international scientific community and to provide copies of all TOGA data sets received to World Data Center B, Oceanography in exchange. In addition to receiving Level II-B data sets from the Subsurface Thermal Data Centre in Brest for both Atlantic and Indian Oceans data, WDC-A, by virtue of its collocation with the U.S. NODC, also has access

to the Tropical Pacific Ocean data set prepared jointly by NODC and the Scripps Institution of Oceanography (SIO), serving as the Joint Environmental Data Analysis (JEDA) Center. JEDA tracks, acquires, quality controls, and merges all available subsurface thermal data for the Tropical Pacific in support of the TOGA program. Data sets containing both Atlantic and Indian Oceans data, as well as the JEDA Pacific Ocean data set, are available on magnetic tape in the GF-3 format from
WDC-A, Oceanography.

Time-Series Data Inventories

Long time-series oceanographic measurements are essential inputs for climate-related programs, such as WOCE and TOGA. The IOC and the CCCO have identified the acquisition of such data as a priority item in the data base required for climate studies. WDC-A, Oceanography is utilizing its Catalogue of Data to assist NODC in compiling inventories of ocean measurement (oceanographic station data and STD/CTD) programs that have repetitive sampling at the same locations for long time periods. A total of 27 time-series data sets ranging in minimum duration from five years for North Pacific Ocean Weather Stations and related sections to more than 30 years for the CALCOFI sections have been identified and researched. A total of 56 North Atlantic sections have also been fully inventoried. A third Inventory covering the remainder of the World Oceans is currently in work. Each data set constitutes the basis for a new data product that will be available on magnetic tape from NODC and WDC-A.

Inventories of Specialized Data Sets

In response to an initiative by the TC/IODE, WDC-A Oceanography has now added to its Change Notices a separate section containing inventories describing data sets held by the various Responsible National Oceanographic Data Centers (RNODCs), as well as data sets held by other Specialized Data Centers. This is expected to provide an effective means of advertising these Data Centers' capabilities by using the Change Notices as a mechanism to disseminate the information to the international community through WDC-A's distribution system. WDC-A will include in each Change Notice the information and documentation necessary to adequately describe each data set. Where appropriate, information will be provided to WDC-A by RNODC's on an annual basis in a form essentially ready for printing. WDC-A will not provide tabulation, inventorying, or manuscript preparation services.

DATA EXCHANGE POLICY OF WORLD DATA CENTER A, OCEANOGRAPHY

World Data Centers are held responsible for the provision of data and information to qualified requesters in the scientific community either in exchange or at a cost not to exceed that of processing and shipping. Unless a requester specifies otherwise, the Center is responsible for using the method which most satisfactorily reproduces the data or information item at the least cost. For certain types of requests, limitations in funding, personnel, or facilities may preclude direct or free provision of data or information by the World Data Center.

Data exchanges between WDC-A, Oceanography and WDC's in the same discipline usually take place without charge for routine exchanges of mutually agreed-upon types of data received by WDC-A in internationally-approved data exchange formats and in readily reproducible media forms. Non-standard data types are not normally exchanged. The ICSU Panel has now recognized that it is not always economically feasible to copy large data sets from one WDC to another. For certain types of data, the exchange of inventories of available data in a WDC subcenter may be considered acceptable in lieu of the transfer of the actual data sets.

In general, reasonably-sized requests from national or regional contributors to WDC-A, Oceanography may be considered as exchange, and equivalent data thus provided to the requester without charge. For requests for unusually large amounts of data, for specially formatted data, for derived data products, or for data to be obtained from outside the WDC system, WDC-A will normally be required to recover the costs of processing and shipping, or, at its discretion, may arrange for the request to be serviced by an RNODC or a regional, national, or disciplinary center. WDC-A may serve as an intermediary or coordinator for requests for unique types of data or data in other disciplines by placing the originator of the request in contact with the appropriate institution or disciplinary center.

Normally, WDC-A, Oceanography considers its data exchange commitment with a cooperating Data Center to be limited to the servicing of those requests or routine updating requirements intended to build or enhance standard data bases operated by that Center for specific, mutually agreed-upon data types and geographical areas of national or scientific interest. If the availability of funding and resources permit, WDC-A also attempts to assist such cooperating Data Centers when they require special data sets for institutions that are performing project-related research for international climate and global change programs and/or that have historically contributed data to WDC-A, Oceanography through that Data Center. WDC-A, Oceanography is obliged, in any case, to follow the exchange and cost recovery policies of its sponsoring (funding) government agency, while attempting to maintain consistency with data exchange guidelines of the ICSU Panel on WDC's as published in the ICSU Guide.

Data and information may be requested from WDC-A, Oceanography through NODCs, Designated National Agencies, or any other organization identified by national or international initiatives as responsible for communication with the World Data Centers. These materials may also be requested directly from WDC-A, Oceanography. Organizations, institutions, or individuals from Member States of the IOC may apply to the IOC Secretariat or UNESCO for possible assistance in funding their projects.

Data Centers or institutions in the international community that have acquired an automated data set or specialized data product from WDC-A must be aware that the original data set may be updated from time to time, errors corrected, or spurious data deleted by the originating data center. Where duplicate data sets are deliberately held in this way, the holder is responsible for making regular contact, as required, with the originating center to check whether the old data set is still valid, whether it should be deleted, or whether new data are available. WDC-A bears no responsibility in the conduct of these arrangements, except as regards the provision of information in its role as a coordination and referral center.

DATA AND INFORMATION SUPPLIED

In response to requests, 126 shipments (table 13) were made during 1988 consisting of data for 183,140 oceanographic stations, data for 677,468 other observations including data for MBT's, XBT's, SBT's, and current observations, 4,158 additional data sheets, 314 publications, 70 WDC-A catalogues, and 32 WDC-A reports. In addition to routine distribution to addressees on the Center's mailing lists, shipments were made to 20 nations and 2 international organizations.

Since most of the data received by WDC-A are subsequently acquired by the U.S. National Oceanographic Data Center (NODC), placed into its automated data processing system, and geographically sorted by machine, requests for data for a specific geographic area, or requests with other specialized requirements, may be handled for WDC-A by NODC.

Table 13. -- Summary of data, publications, and information supplied to nations and international organizations during 1988

Nation	No. of ship-ments	No. of serial stations	No. of data sheets*	No. of other obser-vations	No. of publi-cations	No. of WDC-A † Cata-logues	WDC-A † Reports
1. Argentina	2	30,179	15				
4. Brazil	1	61,815					
6. Canada	2		112	XBT-180			
13. France	2		22		1		
14. Germany (F.R.)	5	47,914	54	Surface Currents-657,113			
19. India	2	490	37	Currents-494 XBT-16,488 SBT-926	11		
24. Japan	5	18					
25. Mexico	2				7		2
26. Netherlands	1	4		MBT-61 XBT-24			
27. New Zealand	1						2
29. Pakistan	16				27		
36. South Africa	2	4,735	15				
38. United Kingdom	2	1,072	365				
39. United States	31	13,489	1,290		42	9	21
64. Arab Republic of Egypt	2		7			2	1
72. Trinidad & Tobago	4				69	50	1
73. People's Republic of China	3		2		7	3	2
75. Mauritania	1	734	12				
Kenya	1				1		
Papua New Guinea	2	68	12		34		
Total	87	160,518	1,943	675,286	199	64	29

See footnotes at end of table.

Table 13. -- Summary of data, publications, and information supplied to nations and international organizations during 1988 (continued)

International organization	No. of shipments	No. of serial stations	No. of data sheets*	No. of other observations	No. of publications	No. of WDC-A †	
						Catalogues	Reports
ICES	3	4,942	82				
WDC-B, Oceanography	36	17,680	2,133	XBT-2,182 **	115	6	3
Total	39	22,622	2,215	2,182	115	6	3
Total shipments to nations and international organizations	126	183,140	4,158	677,468	314	70	32

* In additon to serial stations
** TOGA XBT Data Set for the Atlantic Ocean
† In addition to routine distribution to addressees on mailing list.

PUBLICATIONS

Oceanographic Data Exchange, 1987 and Change Notice Nos. 38 and 39 to the Catalogue of Data were distributed during April.

Supplement No. 18 to the Catalogue of Accessioned Publications was distributed during July.

REFERENCES

1. Catalogue of Data; 6 vol., WDC-A, Oceanography; November 1967.

2. Change Notice Nos. 1, 2, 3, 4, 5, 6, 7 and 8, 9, 10, 11, 12, 13 and 14, 15, 16, 17 and 18, 19, 20 and 21, 22, 23 and 24, 25 and 26, 27, 28 and 29, 30 and 31, 32 and 33, 34 and 35, 36 and 37, 38 and 39, and 40 and 41, to the Catalogue of Data; WDC-A, Oceanography; April 1968, March 1969, May 1969, December 1969, April 1970, December 1970, December 1971, April 1972, November 1972, March 1973, April 1974, April 1975, December 1975, May 1976, January 1977, November 1977, May 1978, February 1979, May 1980, March 1981, December 1981, October 1982, December 1983, September 1984, September 1985, November 1986, December 1987, and December 1988.

3. Fourth Consolidated Guide to International Data Exchange through the World Data Centres; ICSU Panel on World Data Centres, Washington; June 1979.

4. Manual on International Oceanographic Data Exchange; Intergovenmental Oceanographic Commission, Technical Series 9, fourth edition (revised), UNESCO, Paris; 1976.

5. International Marine Science; Vol. No. 1, through Vol. VII, No. 4, UNESCO, Paris; 1963-70.

6. Oceanographic Data Exchange, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, and 1987; WDC-A, Oceanography; June 1976, June 1977, July 1978, July 1979, Sept. 1980, July 1981, July 1982, Aug. 1983, Aug. 1984, Aug. 1985, Oct. 1986, Nov. 1987, and Nov. 1988.

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